## REMARKS

Claims 1-20 are pending. Claims 1, 2, 11-13, 17 and 20 have been amended. Additionally, portions of the specification have been amended to improve readability. Applicants respectfully request reconsideration of the application in response to the non-final Office Action.

### Allowable Subject Matter

Applicants gratefully acknowledge the indication that claims 9 and 18 would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. For the reasons presented herein, Applicants believe claims 9 and 18 to be allowable in their current form and have therefore elected not to rewrite these claims in independent form at this time.

### Claim Rejection – 35 U.S.C. §102

Claims 1-3, 7, 8, 11, 13, 14, 17 and 20 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 6,430,306 to Slocum *et al.* ("Slocum"). Applicants traverse the rejection for at least the following reasons.

Independent claim 1 recites a system for detecting a face that includes:

> a memory unit for storing eigenvectors and weights extracted from a plurality of training images;
> a facial image recognition unit for extracting eigenvectors and weights of respective face components from an input facial image; and
> a facial image decision unit for deriving an algorithm for deciding whether input facial images are occluded using the eigenvectors and weights of the training images stored in the memory unit, and for deciding whether the input facial image is occluded by substituting the eigenvectors and weights of the input image extracted in the facial image recognition unit into the derived algorithm.

Applicants respectfully disagree that Slocum teaches the facial image decision unit "for deriving an algorithm for deciding whether input facial images are occluded using the eigenvectors and weights of the training images, and for deciding whether the input facial image is occluded by substituting the eigenvectors and weights of the input image extracted in the facial image recognition unit into the derived algorithm," as recited in claim 1. (See, Office action at page 3, citing Slocum at FIG. 2, element 170).

Slocum describes a verification module that performs a process 100, which employs image information acquired by an image acquisition element 30 and text information to verify each record being entered into an official record database, such as a database of registered drivers for a state department of motor vehicles. (Slocum at col. 8, lines 10-21). Slocum teaches that the verification module determines, in step 170, whether there is one or more very similar or duplicate images existing within the official record database. (Slocum at col. 9, lines 55-61 and FIG. 2). Thus, while Slocum describes determining whether a face image is a duplicate face image, nowhere does Slocum describe deciding whether an input facial image is occluded by substituting extracted eigenvectors and weights of the input image into a derived algorithm for deciding whether input facial images are occluded.

Slocum describes an alternative process 300 that allows the verification module to compare select facial features of different images. (Slocum at col. 14, lines 12-14). Slocum describes that a system operator can employ this alternative practice to detect images recorded in the database memory 24 that have select facial features, which are similar to facial features of an applicant standing in front of

the image acquisition element 30, and that, consequently, the verification module can circumvent the use of disguises by an applicant attempting to fraudulently obtain registration into the database. (Slocum at col. 14, lines 14-22). In other words, if the operator determines an applicant is using disguises, the operator can select (non-disguised) features of the applicant and initiate a search for images in the database that have features similar to the selected (non-disguised) features. Slocum's operator-based technique for comparing select facial features of different images to circumvent the use of disguises by an applicant is different from a facial image decision unit deriving an algorithm for deciding whether input facial images are occluded using eigenvectors and weights of training images, and deciding whether an input facial image is occluded by substituting eigenvectors and weights of the input image into the derived algorithm, as recited in claim 1.

For at least these reasons, Applicants submit that Slocum does not anticipate independent claim 1. Accordingly, Applicants respectfully request that the rejection under §102(b) of claim 1, and of claims 3, 7 and 8, which depend therefrom, be withdrawn.

Similarly, independent claim 11, as amended, recites a method for detecting a face that includes:

> (a) extracting eigenvectors and weights of respective facial components from an input facial image; and
>
> (b) obtaining an occluding-decision algorithm for deciding whether input facial images are occluded using eigenvectors and weights of a plurality of training images, and deciding whether the input facial image is occluded by substituting the extracted eigenvectors and weights of the input image into the occluding-decision algorithm.

For at least the same reasons presented with respect to claim 1, Applicants submit that Slocum does not teach "obtaining an occluding-decision algorithm for deciding whether input facial images are occluded using eigenvectors and weights of a plurality of training images," as recited in claim 11. Further, Applicants respectfully disagree that Slocum teaches "deciding whether the input facial image is occluded by substituting the extracted eigenvectors and weights of the input image into the occluding-decision algorithm," as recited in claim 11. (See, Office action at page 3, citing Slocum at FIG. 2, elements 120 and 130 and col. 8, lines 25, 39-40 and 52).

Slocum describes that, in step 130, the verification module verifies whether an image acquired by the image acquisition element 30 is an image of a face by mapping the acquired image to an image space defined by a reference set of eigenvectors, where similar images, such as images of people's faces, generally map closer together within a particular portion of the image space. (Slocum at col. 9, lines 12-25). Thus, while Slocum describes verifying whether an acquired image is an image of a face, nowhere does Slocum describe deciding whether an input facial image is occluded by substituting extracted eigenvectors and weights of the input image into an occluding-decision algorithm.

Slocum also describes that, in step 120, a process 110 encodes the image information acquired by the image acquisition element 30 using an eigenvector projection technique, which encodes an image of a person's face as a weighted set of eigenvectors by projecting the image of the face onto a space defined by the reference set of eigenvectors. (Slocum at col. 8, lines 23-30). Additionally, Slocum describes that the reference set of eigenvectors used in the eigenvector projection technique can be thought of as a set of features which together characterize the

variation between faces within a reference set of face images. (Slocum at col. 8, lines 30-34). In Slocum, a training reference set of images preferably includes examples of the types of people expected to use the system, including persons of different races, persons with glasses, and persons with facial hair. (Slocum at col. 8, lines 30-34 and lines 48-53).

Thus, while Slocum describes using a training reference set of images that includes images of different types of people in an eigenvector projection technique for encoding an image of a face, nowhere does Slocum describe obtaining an occluding-decision algorithm for deciding whether input facial images are occluded using eigenvectors and weights of a plurality of training images, or deciding whether an input facial image is occluded by substituting extracted eigenvectors and weights of the input image into the occluding-decision algorithm.

For at least these reasons, Applicants submit that Slocum does not anticipate independent claim 11. Accordingly, Applicants respectfully request that the rejection under §102(b) of claim 11, and of claims 13, 14 and 17, which depend therefrom, be withdrawn.

For reasons analogous to those presented for claims 1 and 11, Applicants submit that Slocum does not anticipate independent claim 20. At a minimum. Slocum does not teach "deriving an occluding-decision algorithm using the extracted values of the image classes, eigenvectors and weights of the training images" and "deciding whether the input facial image is occluded by substituting the extracted eigenvectors and weights of the input facial image into the derived occluding-decision algorithm," as recited in claim 20. Accordingly, Applicants respectfully request that the rejection under §102(b) of claim 20 be withdrawn.

**Claim Rejections – 35 U.S.C. §103(a)**

Claims 4 and 12

Claims 4 and 12 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Slocum in view of U.S. Patent No. 6,944,319 to Huang *et al.* ("Huang"). Applicants respectfully traverse the rejection.

For at least the same reasons presented with respect to independent claims 1 and 11, from which claims 4 and 12 depend, respectively, Applicants submit that claims 4 and 12 are patentable over Slocum and that Huang does not supply, and is not purported to supply, the teachings missing from Slocum. Accordingly, Applicants respectfully request that the rejection under §103(a) of dependent claims 4 and 12 be withdrawn.

Claims 5, 6, 10, 15, 16 and 19

Claims 5, 6, 10, 15, 16 and 19 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Slocum in view of Huang, as applied to claim 12, and further in view of U.S. Patent No. 5,710,833 to Moghaddan *et al.* ("Moghaddan"). Applicants respectfully traverse the rejection.

For at least the same reasons presented with respect to independent claims 1 and 11, from which claims 5, 6, 10, 15, 16 and 19 depend, Applicants submit that claims 5, 6, 10, 15, 16 and 19 are patentable over Slocum and that Huang and Moghaddan do not supply, and are not purported to supply, the teachings missing from Slocum. Accordingly, Applicants respectfully request that the rejection under §103(a) of dependent claims 5, 6, 10, 15, 16 and 19 be withdrawn.

**Conclusion**

It is believed that this Response and Amendment does not require additional fees. However, if additional fees are required for any reason, please charge Deposit Account No. 02-4800 the necessary amount.

In the event that there are any questions concerning this paper, or the application in general, the Examiner is respectfully urged to telephone Applicants' undersigned representative so that prosecution of the application may be expedited.

Respectfully submitted,

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